

COOL CHEMISTRY RESOURCE

PH Testing on Rock Samples

Author(s)

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Year levels

Year 3 and 4

Theme

Tasmania economy relies heavily on the mining industry. A major environmental consideration when mines operate is the acidity of the rocks in the mines. Mines change the natural environment and uncover and remove materials that have been undisturbed for thousands if not millions of years. Rocks with a high acidity can drastically effect the surrounding environment. The mining industry regularly checks rocks using pH testing to ensure that adjustments can be made to the mine site resulting in minimum environmental damage

These activities were developed as a concluding challenge in the class' two science units on pH testing and their unit on rocks and minerals

The class had background knowledge of the differences between rocks and minerals. They also were able to classify rocks into the three major groups (sedimentary, igneous and metamorphic) following a simple flow chart. Students also had an understanding of what is being mined in Tasmania.

Through previous science units students had an understanding of what a 'fair' test was and how a scientific report was written up

Unit Links to National Statements of Learning for Science

Links to the National Statements

Science as a Way to Know year 3
Science as a Body of Knowledge year 3-Matter
Science as a Human Endeavour-year 5

Links to the state curriculum

Links to the Tasmanian Science Curriculum

There are links to several areas of the curriculum in addition to science but as the list is comprehensive we have mainly expanded on the relevant science links. The experiments involve learning new vocabulary, cooperating in groups and critical thinking about new science concepts

Sequence of lessons in unit

Lesson 1: Introduction to pH.

Class Activity Instructions

Introduce the concept of pH and the pH scale. Discuss what it looks like, its importance and the difference between acids and bases. Conduct tests on household products using cabbage dye as an indicator. Class Activity Instructions are from "Let's Experiment" by Dr Paul Savage.

Introduce commercial pH kits purchased from local garden/hardware stores and test school soil samples.

Lesson 2: pH Testing of Rocks*

Class Activity Instructions

Explain that rocks can be classified by their chemical properties and that the pH of crushed rock samples can be measured using commercial pH test kits. Time may vary with the introduction depending on the experience the class with pH kits.

Outcomes

Select a range of rock samples that will give a range of pH values when tested with a commercial pH testing kit. Include calcium carbonate(base) and acid washed sand(acid). We also tested dolomite, clay and an unknown sedimentary rock.

Student work

Instruct students to record their results in a table and that a table of data is a useful tool for recording and comparing observations in this investigation

Teacher reflection

Test the rock samples and discuss reasons for any variation in results obtained for the same samples

The total lesson time should be around 40 minutes for students previously introduced to pH testing and commercial test kits.

**Prior to this lesson our students were visited by our teacher associate from Burnie Research Laboratories. He explained the nature of his work and the significance of his job to the mining industry and why pH testing of rock samples is an important process. Students related stories about their relatives who are working in local mining industry
Through this unit students were encouraged to bring along rock samples from home and to discuss their work previously completed on rocks and minerals*

Further Activities

Visit Burnie to Research Laboratories

Students visited the TA lab where they could see first hand of Chemists working with rock samples. This provided an excellent opportunity to see a working lab and how rocks are tested from the mines.

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Visit to Mount Bischoff - Waratah

Students visited Mt Bischoff to see first hand a mine and talk to miners on why PH testing is important. This provided an opportunity to question miners about the importance of PH testing and to see a working mine